R E M A R K S

In the present Office Action, claims 1-32 were examined. Claims 2-9, 15-21, 23, 25-27 and 29-31 were withdrawn from consideration. Claims 1, 10-14, 24, 28 and 32 were rejected. By this amendment, claims 1, 11, 13, 24, 28 and 32 have been amended. Claims 33-35 have been added. No new matter has been added. Claims 1, 10-14, 24, 28 and 32 are believed to be in condition for allowance.

Rejections under 35 U.S.C. 112

The Examiner rejected claims 1, 10-14, 24, 28 and 32 as being indefinite for failing to particularly point out and distinctly claim the subject matter of the present invention. Specifically, the Examiner noted in claim 1, lines 4-5, the presence of a broad range limitation together with a narrow range limitation falling within the broad range. Claim 1 has been amended to remove the offensive language. In addition, claim 33 has been added wherein there is included the language excised from claim 1. The Examiner additionally notes several grounds for rejection regarding wording directed to "plasma spraying" as recited in claim 1. Claim 1 has been amended to remove the confusing language. As a result, claims 34 and 35 have been added to more clearly define the original language of claim 1. The Examiner additionally cited numerous areas of confusion arising from the language concerning plasma spraying. As amended, claim 1 is now definite as to its meaning.

The Examiner rejected claim 11 stating that it was unclear as to its meaning. The unclear language has been removed.

The Examiner notes that "high power" and "high-speed" are vague and indefinite. Applicant respectfully responds that "high-speed flame spraying" and "high-power plasma spraying" are standard technical terms with well defined meanings to those skilled in the art. The Examiner cites numerous instances involving a lack of proper antecedent basis in claims 1, 10, 11, 13, 14, 28 and 32. The Applicant has amended the appropriate claims to insure proper antecedent basis.

As a result of these amendments, Applicant respectfully traverses all of the Examiner's grounds for rejections with respect to claims 1, 10-14, 24, 28 and 32. Applicant therefore believes the aforementioned claims to be in condition for allowance.

Rejections under 35 U.S.C. 103

The Examiner rejected claims 1, 10, 12-14, 24, 28 and 32 as being unpatentable over Inoue et al. in view of Savkar et al.

The Examiner noted that Inoue et al. teaches all of the features of the claims of the present invention with the exception of an on-line monitoring and control system. The Examiner further notes, however, that Savkar et al. teaches a method and apparatus for controlling the deposition of a powder and a plasma spray process wherein the spray process is monitored by an on-line system. The Examiner therefore draws the

conclusion that it would have been obvious to one of ordinary skill in the art at the time of the invention and at the time the invention was made to modify Inoue et al. to use the on-line monitoring and control system suggested by Savkar et al. in order to provide optimized deposition of the coating under the substrate.

Applicant respectfully disagrees with the Examiner as regards to the obviousness of combining the teachings of Inoue et al. and Savkar et al. Specifically, Applicant maintains that Inoue et al. in fact teaches away from the combination of Inoue et al. and Savkar et al.

Inoue et al. does in fact teach the deposition of powder on the substrate using a plasma spray process. Inoue et al. teaches to deposit a thick film coating, having a thickness exceeding 300 μm (col. 4, lines 3-7 and lines 21-23). In fact, Inoue et al. specifically describes the deposition of a thin coating to be a drawback (col. 2, lines 26-30). The reason for this aversion to a thin coating arises from Inoue et al.'s teaching that the deposition of a magnetite layer is only for purposes of protecting an electrode surface (col. 1, lines 6-9), thus yielding a protection against chemical influences of the surface which is not exposed to mechanical forces. In addition, the use of the coating described by Inoue et al. for electrodes does not necessitate the deposition of a magnetic layer with uniform thickness.

In contrast, it is the object of the present invention to provide a magnetite coating in use for protecting a surface not only against chemical influences, but especially against mechanical wear, not only for electrodes, but also for machine parts. Importantly, these facts necessitate deposition of only a thin layer of magnetite, as well as the deposition of a magnetite layer with a uniform thickness. It is the requirement of providing a thin magnetite layer of uniform thickness which necessitates the use of the computer controlled magnetic deposition of the present invention. As a result, there is nothing in Inoue et al. to teach or suggest combination with any other piece of prior art to produce a thin magnetite layer of uniform thickness.

However, even were the teaching of Inoue et al. to be combined with Savkar et al., the result would still not teach the present invention as claimed. Savkar et al. teaches a process where the location and pattern of a deposition is monitored and controlled (col. 1, lines 7-12; col. 5, lines 25-30; and col. 6, lines 17-20). The monitoring is performed by controlling the feed rate of the powder and carrier gas and the amount of carrier gas (col. 5, lines 65-69).

In contrast, the present invention proposes to measure a plethora of parameters, such as a cooling rate or coating temperature by means of high speed pyrometry (page 6, lines 21-23), the speed of the particles using laser Doppler anemometry (page 6, lines 30 and page 7, line 10), an imaging process for

location-resolved determination of size and shape of individual powder particles using particle shape imaging (page 7, lines 18-21), etc. This sophisticated form of feedback control allows for an improved deposition of the material, resulting in a more homogeneous material layer which can be thinner as well. As is evident, the teachings of Savkar et al. are not sufficient to produce a thin magnetite layer of uniform thickness as achieved by the present invention.

There is, therefore, nothing in Inoue et al. or Savkar et al. taken alone or in combination, to teach or suggest the present invention as claimed. In addition, there is nothing to suggest combining Inoue et al. and Savkar et al. In fact, as noted above, Inoue et al. actually teaches away from the deposition of a thin magnetite layer of uniform thickness. Therefore, Applicant respectfully traverses the Examiner's grounds for rejection with regard to claim 1 of the present invention. Claim 1 is therefore believed to be in condition for allowance. As claims 10, 12-14, 24, 28 and 32 are dependent upon claim 1, claim 1 now believed to be in condition for allowance, these claims are likewise believed to be in condition for allowance.

The Examiner additionally rejected claim 11 over Inoue et al. in view of Savkar et al. and in further view of Yoshinaka et al. Claim 11 is dependent upon claim 1. As claim 1 is believed to be in condition for allowance for the reasons recited above, claim 11 is likewise believed to be in condition for allowance.

An earnest and thorough attempt has been made by the undersigned to resolve the outstanding issues in this case and place same in condition for allowance. If the Examiner has any questions or feels that a telephone or personal interview would be helpful in resolving any outstanding issues which remain in this application after consideration of this amendment, the Examiner is courteously invited to telephone the undersigned and the same would be gratefully appreciated.

It is submitted that the claims as amended herein patentably define over the art relied on by the Examiner and early allowance of same is courteously solicited.

If any additional fees are required in connection with this case, it is respectfully requested that they be charged to Deposit Account No. 02-0184.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claims 1, 13, 24, 28 and 32 have been amended as follows:

1. (Amended) A process for producing a corrosion- and wear-resistant layer on a substrate by spraying on an iron oxide-based material, characterised in that the iron oxide-based material which has at least 20% by weight [and preferably more than 30% by weight] of magnetite (Fe_3O_4 and/or Fe_2O_4) is applied by on-line controlled plasma spraying[, in particular high-speed flame spraying, or plasma spraying, in particular plasma spraying in air or vacuum, high-power plasma spraying (HPPS), shroud plasma spraying (SPS), by on-line controlled wire flame spraying or arc wire spraying,] and in that [operation] the layer of the material is monitored by an on-line monitoring and control system.

11. (Twice Amended) A process for producing a corrosion- and wear-resistant layer as set forth in claim 1 characterised by an on-line controlled plasma spray process [in which air is used as the plasma gas].

13. (Thrice Amended) A process for producing a corrosion- and wear-resistant layer on a substrate by thermal spraying as set forth in claim 1 characterised in that [it] said material to be sprayed has at least 20% by weight of magnetite (Fe_3O_4 and/or $FeFe_2O_4$).

24. (Thrice Amended) A process as set forth in claim 13 characterised by a grain size of [the powder spray material] said material to be sprayed of between 0.05 and 150 μm.

28. (Amended) A process for producing a corrosion- and wear-resistant layer on a substrate by thermal spraying as set forth in claim 1 characterised in that [it] said material to be sprayed has more than 30% by weight of magnetite (Fe_3O_4 and/or [Fe]Fe_2O_4).

32. (Amended) A process as set forth in claim 13 characterised by a grain size of [the powder spray] said material to be sprayed of between 0.1 and 120 μm.

Please add claims 33-35.

33. The process as set forth in claim 1 wherein said spraying said iron oxide-based material comprises spraying said iron oxide-based material having more than 30% by weight of magnetite (Fe_3O_4 and/or Fe_2O_4).

34. The process as set forth in claim 1 wherein said spraying by on-line controlled plasma spraying comprising a mode of spraying selected from the group consisting of high-speed flame spraying, plasma spraying, high powered plasma spraying

(HPPS), shroud plasma spraying (SPS), on-line controlled wire flame spraying, thermal spraying and arc wire spraying.

35. The process as set forth in claim 1 wherein said spraying by on-line controlled plasma spraying comprises plasma spraying and said plasma spraying is performed in a mode selected from the group consisting of plasma spraying in air and plasma spraying in a vacuum.